

**Claims:**

1. A method for controlling the bias point of a Mach-Zehnder modulator, said method comprising the steps of:
  - applying a dither signal to a DC bias that is applied to a Mach-Zehnder modulator;
  - detecting a component of an optical output signal provided by the Mach-Zehnder modulator that is synchronous with the dither signal; and
  - adjusting the dither signal to maintain the detected component of the optical output signal at a substantially constant value.
2. The method of claim 1 wherein the detecting step includes the step of generating an AC feedback signal.
3. The method of claim 2 wherein the adjusting step includes the step of demodulating the AC feedback signal to generate a DC error signal.
4. The method of claim 3 further comprising the step of adding a variable DC offset signal to the DC error signal to generate a resulting error signal.
5. The method of claim 3 further comprising the step of integrating the DC error signal.
6. The method of claim 4 further comprising the step of integrating the resulting error signal.
7. An apparatus for controlling the bias point of a Mach-Zehnder modulator, comprising:
  - means for applying a dither signal to a DC bias that is applied to a Mach-Zehnder modulator;

means for detecting a component of an optical output signal provided by the Mach-Zehnder modulator that is synchronous with the dither signal; and

means for adjusting the dither signal to maintain the detected component of the optical output signal at a substantially constant value.

8. The apparatus of claim 7 wherein the detecting means comprises a photodetector generating an AC feedback signal and a gain and narrow-band filter filtering the AC feedback signal.

9. The apparatus of claim 7 wherein the applying means comprises means for generating the dither signal.

10. The apparatus of claim 9 wherein the dither signal generating means comprises a spread-spectrum source.

11. The apparatus of claim 8 wherein the adjusting means includes a synchronous demodulator for demodulating the AC feedback signal received from the gain and narrow-band filter to generate an error signal and an integrator for integrating the error signal.

12. The apparatus of claim 11 further comprising an offset voltage compensator for adding a variable DC offset signal to the error signal.